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NAMRU-6 Entomology Department Helps Take the “Bite” out of Insect-borne Disease Threats

Filed under FLEET AND THE FLEET MARINE FORCE, FORCE HEALTH AND SAFETY, HEATH [NO COMMENTS]

By Cmdr. Frederick M. Stell (current) and Lt. Cmdr. Roxanne G. Burrus (outgoing), department heads, Department of Entomology, U.S. Naval Medical Research Unit No. 6, Peru

** Editor’s note: This is blog number 3 out of 6 in a series of blogs from NAMRU-6.*



Model residential huts constructed in Iquitos for testing novel combinations of mosquito attractants and repellents. (Courtesy photo)

U.S. military personnel deployed on the ground throughout the world are often exposed to insect-borne diseases. The [Entomology Department](#) at the [U.S. Naval Medical Research Unit No. 6, Peru](#), leads research projects in surveillance and control of insect vectors of dengue fever, malaria and leishmaniasis and often collaborates on projects with local Peruvian universities and the Ministry of Health in order to develop better mosquito and sand fly control strategies in cooperation with the host nation.

One novel mosquito control strategy is focused on testing new combinations of mosquito attractants and repellents which are applied inside a series of model residential huts, a design meant to replicate the living environment typically found in the tropical cities of Peru and other South American cities. This work will help determine the effect of insect repellents on the movement patterns of mosquitoes and whether it may be possible to achieve successful repellency of mosquitoes from residences or whether they will simply move to another untreated location to feed on a host. Data gained from this project could help guide further

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study of the pre-treatment of tents for deployed personnel and whether this may be a useful strategy during contingencies.



Entomology personnel preparing the insecticide resistance bioassay in the Iquitos Laboratory, Peru. (Courtesy photo).

Insecticide-resistance bioassays are also performed by the Entomology Department on the vector of dengue fever, *Aedes aegypti*, and on the malaria vector, *Anopheles darlingi*, by exposing groups of mosquitoes to the primary chemical groups (e.g. pyrethroids and organophosphates) used in their control in order to establish a resistance-profile baseline against reference populations of known susceptible mosquito strains. A new collaboration between NAMRU-6 and the University of San Marcos in Lima has been initiated, resulting in the establishment of an insectary to rear mosquitoes for use in bioassays to determine insecticide-resistance

levels. Although mosquito populations in Peru may only represent a fraction of all populations worldwide, refining the testing process with field-collected insects is critical and the variety of ecosystems in Peru, such as desert, tropical rainforest, and mountain, enables the testing of numerous strains of varying insecticide resistance status, a condition which could be encountered by deployed personnel anywhere in the world.



Entomology Department, U.S. Naval Medical Research Unit No. 6. From left to right: Roberto Fernandez, Esar Aysanoa, Cmdr. Stell, Victor Zorrilla, Lt. Cmdr. Burrus, Maria Huaylinos, Dr. Gissella Vasquez, Gabriela Calle, Dr. Carmen Flores, Liz Espada. (Courtesy photo)

The Department of Entomology supports the host-nation of Peru in building the capacity to conduct vector-borne disease research through collaboration on these projects, providing equipment and technology training, and designing future studies to address local public health concerns. A previous dengue fever outbreak in Iquitos (Department of Loreto)

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provided the opportunity for NAMRU-6 to assist the Ministry of Health by providing specialized mosquito traps to capture the *Aedes aegypti* vector and supporting the surveillance and control efforts of their public health staff to help control this disease in Iquitos. In addition, capacity-building training courses on mosquito surveillance have been provided to DISAMAR (Direccion de Salud de la Marina de Guerra del Peru) personnel and have included mosquito collection methods, species identification, basic ecology and habits, and the procedures for insecticide resistance testing.

The Entomology program continues to fulfill NAMRU-6 mission to protect deployed U.S. forces throughout the world while solidifying relationships with host nation entities.

For more information on NAMRU-6, see the website [here](#).

To see the first blog from NAMRU-6 click [here](#). To see the second blog from NAMRU-6 on bacteriology click [here](#).

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